ACUTE INTESTINAL OBSTRUCTION LARGE INTESTINE Vs SMALL INTESTINE AN ANALYSIS

DISSERTATION SUBMITTED FOR

BRANCH - I M.S (GENERAL SURGERY)

MARCH 2009

THE TAMILNADU DR.M.G.R.MEDICAL UNIVERSITY CHENNAI

ACKNOWLEDGEMENT

It gives me immense pleasure to express my deep sense of gratitude to my **Unit Chief Prof. Dr. M.N. KAMALUDEEN, M.S., F.I.C.S, F.A.I.S., Department of General Surgery, Govt. Rajaji Hospital and Madurai Medical College** for his excellent guidance and valuable suggestions during the course of study and in preparation of this dissertation.

I am grateful to **Prof. Dr. M.Gobinath, M.S.,** Professor and Head of the Department of General Surgery, Government Rajaji Hospital, Madurai, for his guidance through out this study.

I am grateful to my unit Assistant Professors, **Dr.S. Balamurugan, M.S., D.O., Dr. S. Karthikeyan, M.S., D.A., Dr. Subbangi. K.G. M.S., D.G.O., Dr. D.N. Sharmila, M.S.,D.G.O.,** for their help and guidance throughout this study.

I express my gratitude to **Dr.S.M. Sivakumar, M.S., Dean,** Government Rajaji Hospital, Madurai Medical College, Madurai for permitting me to use the clinical material for the study.

I express my thanks to my friends who have helped me a lot in preparing this dissertation.

Last but not the least, I heartily thank the patients for their kind support without whom this study not have materialized.

BONAFIDE CERTIFICATE

This is to certify that the dissertation entitled **"ACUTE INTESTINAL OBSTRUCTION LARGE INTESTINE Vs SMALL INTESTINE AN ANALYSIS"** submitted by **Dr. S. SARASWATHI** to the Tamil Nadu Dr. M.G.R. Medical University, Chennai in partial fulfillment of the requirement for the award of **M.S Degree Branch – I (General Surgery)** is a bonafide research work were carried out by her under direct supervision & guidance.

Prof.Dr.M.N. Kamaludeen, M.S., F.I.C.S, F.A.I.S.,
Unit Chief,
Department of Surgery,
Madurai Medical College,
Madurai.

Prof.Dr.M.Gopinath, M.S.,
Head of the Department,
Department of Surgery,
Madurai Medical College,
Madurai.

Prof.Dr.S.M. Sivakumar, M.S.,
The Dean,
Madurai Medical College,
Govt. Rajaji Hospital,
Madurai Medical College,
Madurai.

DECLARATION

I **Dr. S. SARAWATHI** declare that, I carried out this work on, **"ACUTE INTESTINAL OBSTRUCTION LARGE INTESTINE Vs SMALL INTESTINE AN ANALYSIS"** at the Department of Surgery, Govt. Rajaji Hospital during the period of June 2006 to October 2008. I also declare that this bonafide work or a part of this work was not submitted by me or any others for any award, degree, diploma to any other University, Board either in India or abroad.

This is submitted to The Tamilnadu Dr. M. G. R. Medical University, Chennai in partial fulfillment of the rules and regulations for the M.S degree examination in General Surgery.

Place : Madurai **Dr. S. SARASWATHI**

CONTENTS

INTRODUCTION

"It is less dangerous to leap from the Clifton suspension bridge than to suffer from acute intestinal obstruction and decline operation".

Frederick Treves, 1899.

Definition

Intestinal obstruction is defined as a partial or complete interference with the passage of stools distally in the intestine.

History

Hippocrates observed and treated intestinal obstruction. Praxagoras (350 BC) who created an enterocutaneous fistula to relieve an obstruction. Antibiotics were added to the therapy of bowel obstruction in the 1940s and 1950s.

Replacement of fluids, intestinal decompression, antibiotics and improvement in surgical and anesthetic technique has reduced the mortality in simple intestinal obstruction. However the recognition and treatment of strangulating intestinal obstruction remains an important problem for surgeons today. The importance of this condition lies in that early diagnosis and treatment reduces the mortality and morbidity to a great extent.

AIM OF STUDY

1. To study the incidence of intestinal obstruction and to compare the small and large bowel obstruction.

2. To study the etiology, age of presentation of intestinal obstruction.

3. To study the incidence of strangulation.

4. To study the mortality and morbidity.

5. To study the role of plain X-ray in diagnosis of intestinal obstruction.

REVIEW OF LITERATURE

Classification of intestinal obstruction

According to causes

Dynamic or mechanical

Adynamic or paralytic ileus

Mechanical obstruction may be

Extra luminal

Intra mural

Intra luminal

Mechanical obstruction may be

Simple

Strangulating / strangulated

Special varieties if strangulation

Intussusception

Volvulus

Closed loop obstruction

According to clinical presentation

Acute

Chronic

MECHANICAL INTESTINAL OBSTRUCTION

Classification:-

ETIOLOGY OF MECHANICAL INTESTINAL OBSTRUCTION IN ADULTS

LESIONS INTRINSIC TO THE INTESTINAL WALL

A. Congenital

1.Malrotation

2 Meckel's diverticulum

B. Inflammatory

1. Infections

   a. Tuberculosis

   b. Diverticulitis

2. Crohn's disease

3. Eosinophilic granuloma

C. Neoplastic

1. Primary neoplasm
   a. Benign
   b. Malignant
2. Metastatic neoplasms
3. Peutz-Jeghers syndrome

D. Traumatic

1. Hematoma

2. Ischemic stricture

E. Miscellaneous

1. Intussusception

2. Endometriosis

3. Radiation enteropathy /stricture

4. Post ischemic stricture

5. Stricture due to potassium tablets or phenylbutazone

6. Intramural hematoma in patients on oral anticoagulants

LESIONS EXTRINSIC TO THE INTESTINAL WALL

A. Adhesions

Postoperative

Congenital

Post inflammatory

PATHO PHYSIOLOGY

Each day the GIT secretes and reabsorbs 8-12 litres of intestinal, gastric, pancreatic and biliary secretion.

Oral intake	2000ml
Salivary gland secretion	1000ml
Gastric juice	1500 ml
Pancreatic Juice	1500 ml
Bile	1000 ml
Intestinal Secretion	2000ml

Most of the fluid and electrolyte load is absorbed in small intestine and about 1-1.5 litres reach the caecum. The colon normally absorbs most of water and sodium and secretes K+ ion so that the stool water is about 200ml.

The normal adult has a mean intestinal gas volume of about 100ml and excretes a variable amount ranging from 300 to 2000 ml daily. The composition which is highly variable contains.

N_2 - 24-80%

O_2 - 0.1-2.5%

H_2 - 0.6-50%

CO_2 - 5-29%

CH_4 - 0-26%

With mechanical obstruction intestinal fluid accumulates and the intestinal distends. Its volume increases in proportion to the square of the radius. Thus the volume of a meter of intestine of 2 cm diameter approximates to 300 ml. This will increase of 1300 ml if the same segment dilates to a diameter of 4 cms.

Major disruption of orderly balance of secretion and re absorption begins with intestinal obstruction.

Two phases were recognized

- In early intestinal obstruction (<12 hrs.) water and electrolyte accumulates in the lumen because of a decrease in absorption.
- By 24hrs. second phase begins; intra luminal water and electrolyte accumulates more rapidly secondary to a further decrease in absorption.

In simple mechanical intestinal obstruction the non distended proximal intestine is spared initially and the net increase in intestinal volume is minimal because intra luminal fluid is dispersed and absorbed. As obstruction persists and the proximal intestine dilates absorption decreases, secretion increases. This iso osmolar fluid tends to cause an iso osmolar volume contraction which is further exacerbated by vomiting.

MOTILITY OF INTESTINE

Early in the course of intestinal obstruction, small intestinal contractile activity appears subjectively to increase in frequency and intensity. The patient

complains of crampy abdominal pain. The intestine contracts vigorously trying to propel the intestinal contents distally past the obstruction. With sustained increase in intra luminal pressure, contractile activity is reduced and ends. After a period of quiescence (fatigue) this cycle recurs.

Later in the course of obstruction as the proximal intestine dilates progressively, motility becomes sluggish. Contractions appear and is less frequent and less intense.

BLOOD FLOW

Intestinal blood flow is related inversely to intra luminal pressure. When intra luminal pressure was increased to 30mm Hg capillary streaming was interrupted, by 60mm Hg blood flow was interrupted in some vessels. These alterations of mucosal blood flow and overall total blood flow are especially pertinent to closed loop obstruction, in which even greater intra luminal pressure are attained. Thus although intestinal viability is not at risk with simple obstruction, the closed loop obstruction by itself may alter total regional blood flow to the point of threatening intestinal viability.

BACTERIOLOGY

In the absence of obstruction, the jejunum and proximal ileum of the small intestine of human are virtually sterile. Although a resident micro flora exists, consisting of gram +ve facultative organisms their concentration are small

(usually $<10^4$/ml). In contrast in the distal ileum, Coliforms and anaerobic Bacteroides species can be found, but again they represent a relatively low concentration (10^5 to 10^8/g), when compared with colonic bacterial count of 10^9 to 10^{12}/g in stool.

With establishment of intestinal obstruction, however the micro flora of the small intestine changes dramatically not only in type of organisms but also in absolute no. of organisms. Proximal to the obstruction, Coliform multiply profusely reaching concentration of 10^9 to 10^{10}/ml consisting mostly of E. coli, Strept. Fecalis, Klebsiella, Proteus and Pseudomonal species. Clostridium and Bacteroides species constitute the predominant anaerobic isolates. The fecal flora proliferates in direct proportion to duration of obstruction and to extent of intestinal distension.

Distal to obstruction, the intestinal content is sterile or contain scant Coliforms. Those bacteria that proliferate during intestinal obstruction originate primarily from oral ingestion, retrograde spread from colon and terminal Ileum however probably occur to some extent in more distal small intestinal obstruction. In any case with established intestinal obstruction, preoperative antibiotic prophylaxis is indicated and peritoneal spillage by small intestinal content should be avoided if possible.

SYSTEMIC EFFECTS OF INTESTINAL OBSTRUCTION

The spectrum of intestinal obstruction is related to the site, extent and duration of obstruction. The common denominator in the systemic response to intestinal obstruction involves the isotonic contraction, dehydration that accompanies not only the intestinal and peritoneal sequestration of extra cellular fluid but also associated vomiting. Hypokalemia often is present and is secondary to persistant vomiting, intestinal secretion and elevation in serum aldosterone levels.

Cardiovascular effects manifest as tachycardia and hypotension, cardiac irritability due to hypokalemia and elevated catecholamines. Respiratory compromise may occur with severe abdominal distension or secondary to aspiration of vomitus, prerenal azotemia or acute renal failure may intervene.

When strangulated obstruction supervenes the fore-mentioned systemic effects are magnified. Hemorrhage both into the intestinal wall and into the lumen exacerbates hypovolemia. Intestinal infarction may precipitate both a metabolic acidosis and sepsis with associated vascular collapse.

CLINICAL PRESENTATION

Cardinal symptoms of intestinal obstruction are nausea and vomiting, colicky abdominal pain, obstipation and abdominal distension.

Pain :

Crampy abdominal pain and distension are absent when the proximal

intestine is able to decompress in retrograde manner into the stomach. In contrast with more distal obstruction pain is episodic, cramping, often diffuse, poorly localized and lasting 1-3 minutes. Between spasm, pain resolves completely.

With high obstruction, the quiescent interval between spasm is 1-3 minutes, in more distal obstruction 10-15 minutes may separate episodes of pain. These episodes of colic occur synchronously with borborygmi and after that the patient double up with pain. This is in contrast to patients with peritonitis who lie rigidly still.

The onset of obstipation is a late development. Indeed the patient may continue to have bowel movement and to pass flatus as the distal, unobstructed intestine empties.

Vomiting:

In early stages of obstruction, the vomiting contains undigested food particles. With time it becomes bilious. Finally when the obstruction becomes complete and the dilated intestine allows bacteria to proliferate in the stagnant intestinal lumen, the vomiting turns feculent, indicating late established intestinal obstruction.

With closed loop obstruction or with incarceration of intestine in a hernial orifice, a relentless reflux vomiting may be the initial symptom.

This represents an abdominal reflex related to acute unrelieved intestinal

obstruction and strangulation. In large bowel obstruction vomiting will be late.

Distension:

Distension is minimal or absent in upper small bowel obstruction and mesenteric vascular occlusion. It is delayed in colonic obstruction. Severe distension is usually encountered in low small bowel obstruction eg. Caecal neoplasm, mechanical obstruction of left colon, volvulus of sigmoid and Hirschsprung's disease.

Constipation:

In large intestinal obstruction constipation will be earlier. Obstipation means both feces and flatus not passed.

Pyrexia:

Fever may signify:-

1. onset of strangulation
2. intestinal perforation
3. presence of inflammation associated with obstructive disease, abscess due to diverticulitis or localized perforation of an ulcerating colonic cancer and inflammatory bowel disease. Hyperthermia has a sinster significance and may be due to severe hyponatremia or septic shock.

Abdominal tenderness:

Localized tenderness in the abdomen or an external hernia indicates

strangulation with overt infarction and/or perforation. The development of rigidity with rebound tenderness signifies onset of perforation.

Water and salt depletion and hematological changes:

Water and salt depletion result in increase in hematocrit, oliguria, drying of skin and tongue, poor venous filling and sunken eyeballs. Hypokalemia is not a usual feature. A rise in serum K+ may accompany the onset of strangulation. There is rise in serum amylase and LDH with mild leucocytosis.

Auscultation:-

Reveals obstructed bowel sounds with abnormal borboygmi of splashes and rushes that coincide with the abdominal colic. With late, neglected obstruction bowel sounds may be absent.

Radiological studies:-

The accuracy of diagnosis of intestinal obstruction on abdominal X-ray is 80-85%.

Gas shadows:-

When the jejunum, the ileum, or the colon is distended with gas, each has a characteristic appearance that allows it to be distinguished radiologically. The diameter of the viscus is no criterion as to whether it is small or large intestine. Obstructed small intestine is revealed by relatively straight segments that generally lie more or less transversely; obstructed large intestine is disclosed by its

haustrations markings, a distended caecum is shown by rounded gas shadow in the right iliac fossa. Jejunum is characterized by its valuvulae conniventes that pass from the antimesenteric to the mesenteric border, spaced regularly, giving rise to concertina effect.

Ileum:

The distal ileum is characterless

Large intestine:

(Caecum excepted) shows haustral folds. Haustral folds unlike valuvlae conniventes, are spaced irregularly and indentations are not placed opposite one another. Caecal diameter > 9 cm is impending to perforate.

Fluid levels:

1. In infants under the age of 2 years, a few fluid levels in the small intestine are a normal occurrence. In adults, two inconstant fluid levels must be regarded physiological. One is at the duodenal cap, the other which is more infrequent, is within terminal ileum. In intestinal obstruction, it takes a little time for the gas to separate from the fluid consequently fluid levels appear later than gas shadows. When paralysis of intestine has occurred, fluid levels become more conspicuous and more numerous. By the time fluid levels are pronounced, obstruction is advanced. The number of fluid levels is proportionate to the degree of obstructions and to its site in the small intestine; the nearer the obstruction to the ileo caecal

value, the larger the number of fluid levels. Obstruction low in the colon does not commonly give rise to fluid levels in small intestine but in the cases of obstruction high in large intestine this phenomenon is not unusual because in many individual the ileocaecal valve is incompetent.

No radiographic criteria reliably or consistently indicate imminent strangulation. Fixation of bowel loop, thickness of valvulae connivenetes, increasing intra luminal fluid, slow gastric empting, reduced bowel activity and intra peritoneal fluid accumulation strongly suggest impending devitalisation and merit close follow up examination and clinical correlation. In the acutely obstructed patient bowel wall gas with or without mesenteric portal vein gas or pneumo peritoneum gives clear cut evidence that strangulation and devitalisation has taken place.

Gall stone impaction may be evident and air in the biliary tree indicating biliary enteric fistula.

CONTRAST STUDIES:

Antegrade approach:

Contrast given through NG tube. Inspissation and intestinal impaction does not occur because of dilution of the contrast agent in the obstructed intestine.

Water soluble contrast studies can be useful for patient with suspected intestinal perforation.

Retrograde approach is preferred in patients with a presumed distal small intestinal obstruction, for suspected colonic obstruction or in acutely ill patients for whom emergency diagnosis is important.

Diagnostic colonoscopy:-

Should be considered in patients suspected of

1. Non strangulated sigmoid volvulus.
2. Distal colonic stricture
3. Chronically ill patient with caecal dilatation suggestive of pseudo obstruction.

In each of these situations colonoscopy offers therapeutic as well as diagnostic benefits.

The finding of a Corkscrew tapered luminal narrowing at endoscopy suggests a volvulus and often derotation using endoscopy is possible. Endoscopic procedures also have been developed to stent (or) reopen obstructed bowel for palliation or for preparation of bowel for surgery. Also it is useful in colonic stricture in identifying and taking biopsy from the lesion.

CT OF ABDOMEN:

It is useful in patient with subacute obstructive symptoms suspected of

having malignancy. It is also useful in patient with early post operative obstruction of the large bowel in those patient associated with abdominal mass (or) clinical signs of infarction.

Other parameter which can be determined from CT scan included:-

1. Bowel wall thickening.
2. Soft tissue edema associated with inflammation or infection
3. Intramural or extra intestinal gas
4. Abnormal fluid collection.
5. Abnormalities of retro peritoneum
6. Any growth arising from bowel.

In patients with malignancy, CT is helpful in detecting the presence of metastatic lymph adenopathy and liver secondaries.

MANAGEMENT:

SUPPORTIVE MANAGEMENT:

Nasogastric suction by Ryles tube. Appropriate intravenous fluid for replacement is Hartmann's solution or isotonic saline. The amount needed varies from patient to patient and is influenced by clinical findings, biochemical and hematological parameters.

OPERATIVE MANAGEMENT:

When obstruction develops in the early post op period, the original incision is best reopened. With more distant previous intra abdominal operation however it is better to use a midline incision. Adequate therapy involves careful release of the obstruction. Extreme care is necessary when handling the intestine at the actual point of obstruction because strangulation with trans mural infarction commonly has occurred in the isolated region. Remaining of the procedures are complete exploration for other abnormalities, repair of intestinal injuries and resection of nonviable intestine.

Decompression of intestine is by manual, retrograde decompression into the stomach, the anesthesiologist can then aspirate the enteric fluid through the NG tube.

Prevention of recurrent adhesive obstruction.

Noble's plication

Child & Phillips transmesentric plication

STRANGULATION OBSTRUCTION:

Vascular supply to a segment of intestine is compromised.

PATHOPHYSIOLOGY:

Strangulation may be either by extrinsic compression of the mesenteric

arcade (from an adhesive band or a hernial orifice). Most often the vascular compromise involves primarily an obstruction to venous outflow. Less common, variation of strangulation obstruction include local pressure necrosis of a segment of the wall of intestine by an obstructive adhesive band, by a hernial orifice (Ritcher's hernia), or from a true closed loop phenomenon whereby the progressive intestinal distension which is not subject to proximal decompression (vomiting) produce transmural ischemia. Strangulation obstruction either may be reversible if the offending ischemic insult is relieved early enough or may have already produced irreversible injury with transmural necrosis and its sequelae.

First stage of strangulation is primarily a local phenomenon with few systemic manifestation. Venous obstruction resulting initially in vascular engorgement, edema and local venous hypertension. Reflex arterial spasm follow with the subsequent onset of relative tissue anoxia. Capillary integrity is lost and areas of intramural hemorrhage occurs. Stasis leads to secondary vascular thrombosis and further anoxia. The rise in intraluminal pressure with other mentioned factors leads to threatening of mucosal viability. Mucosal infarction and slough follow with subsequent intraluminal hemorrhage. At this stage, intestinal viability may be preserved if the offending obstruction is released.

With persistent vascular obstruction and tissue anoxia, the second stage of strangulation ensues. Transmural infarction follows rapidly, various bacterial

substances and other metabolic products related to tissue infarction are released into peritoneal cavity even before intestinal perforation has occurred.

Diagnosis:

Patient presents in extreme shock, hypothermia, acidosis and diffuse peritonitis.

Increased phosphate level in serum, urine and peritoneal fluid.

Increased LDH, amylase and alk. Phosphatase.

Intraoperative differentiation between viable and nonviable intestine.

Intestine	Viable	Non viable
Circulation	Dark color become lighter; Mesentry bleeds if pricked	Dark color remains, no bleeding of mesentry if pricked
Peritoneum	Shiny	Dull and lusterless
Intestinal	Firm, pressure rings may or may not disappear, peristalsis may be observed.	Flabby, thin and friable. Pressure rings may persist, no peristalsis.

Methods to determine blood flow – Duplex probe fluoressin dye injection.

Functional intestinal obstruction (ILEUS):-

Ileus refers to any condition of intestinal distention due to slowed or absent passage of digesta without a demonstrable mechanical obstruction.

This is due to failure in neuromuscular juncture ie., in the myentric plexus

(Auerbach) and submucous plexus (Meissner's)

Management:-

The essence of this is prevention and the incidence has been greatly reduced by routine NG aspiration and with - holding fluids by mouth, after laparotomy until normal bowel and/or passage of flatus returns. Specific treatment is directed to treat the cause but there are some principles which has general application.

1. The primary cause must be removed.
2. Normal bowel activity will return when distension is relieved.
3. Morphine or pethidine in repeated small doses is well proved and is valuable.
4. Close attention to the fluid and electrolyte balance.
5. Peristalic stimulation has no place in treatment.
6. Surgical treatment is necessary when the adynamic obstruction is secondary to a life threatening disorder(eg:Peritonitis)

SPECIFIC SMALL INTESTINAL OBSTRUCTION HERNIA:-

Inguinal and femoral hernia account for 80% of cases though the proportion of femoral and umbilical hernia which strangulates (20-30%) is greater than of inguinal ones (2-5%). The contents are gripped by the neck of the sac at deep inguinal ring or ileopectineal ligament for femoral hernia. The constricting ring in umbilical hernia is fascial defect in abdominal wall. Swelling has no cough

impulse.

Irreducible hernia should be treated by elective operation. Obstructed and strangulated hernia requires emergency. The constricting ring is divided. Non viable bowel require resection and anastomosis.

ADHESIONS: CAUSES:

Ischemic areas- Site of anastomosis, reperitonealisation of raw areas.

Foreign bodies – Talc, starch, gauze, sutures

Infective disease – Peritonitis, TB

Inflammatory disease – Crohn's disease

Radiation enteritis

Sclerosing peritonitis – practocol.

PREVENTION:

1. Washing the peritoneal cavity with saline and dextran
2. Avoidance of excessive packing with gauze.
3. Covering of anastomoses and raw peritoneal surface with greater omentum.
4. Leaving raw peritoneal areas unsutured.

TREATMENT:

Adhesiolysis, resection and anastomosis if the bowel is non viable.

INTUSSUSCEPTION:

Telescoping of a segment of intestine into an adjacent one. Most common in children. In adult it may present due to polyp or submucosal lipoma.

It may be ileoileal, ileo caecal or ileocolic. The condition is a strangulating type of intestinal obstruction and if treatment is delayed ischemic necrosis of the involved bowel segment and peritonitis are inevitable.

Operative reduction is often possible although the viabilities of the bowel should be carefully checked after reduction.

VOLVULUS:

It is a twist or rotation of a loop of intestine about its mesenteric attachment. It is therefore a sudden obstruction of the closed loop variety if the rotation is complete and ischemia or total vascular occlusion may be present. This usually occurs in the lower ileum.

Operation is the untwisting of the loop if possible. The causative band should be divided.

OBSTRUCTION DUE TO INTERNAL HERNIA

A portion of small intestine passes into one of the retroperitoneal fossa or into a congenital defect of the mesentry, there to be imprisoned.

Treatment is to divide the constricting ring.

OBSTRUCTION FROM STRICTURE OF SMALL INTESTINE

Usually due to tuberculosis or Crohn's disease.

TREATMENT

Expect in emergency a simple stricture should not be bypassed by a lateral anastomoses. Stricture should be excised or stricturoplasty can be done.

TUBERCULOSIS - 2 TYPES

Ulcerative

Hyperplastic

ULCERATIVE

Multiple ulcers in terminal ileum lying transversely and overlying serosa is thickened, reddened and covered with tubercles.

RADIOLOGY:

Barium Meal shows absence of filling of lower ileum and caecum.

HYPERPLASTIC:

Occurs usually is lieocecal region. Early involovement of regional lymph nodes which may caseate.

RADIOLOGY:

Long narrow filling defect in terminal ileum.

TREATMENT:

Ileocecal resection.

MISCELLANEOUS

OBSTRUCTION BY OBTRUATION may be due to gallstone, worms, bolus of food and foreign body.

EMBOLISM AND THROMOBSIS OF SMA

Possible sources are from L.Aurical (in AF) a mural MI, atheromatous plaque, aneurysms, atrial myxoma.

Primary thrombosis is due to areriosclerosis.

TREATMENT:

Is by embolectomy or resection.

SIGMOID VOLVULUS:

Volvulus is defined as the twisting of a hollow viscus organ either around an axis passing longitudinally through it or passing through its mesentery at right angles to the first.

PREDISPOSING FACTORS:

1. Narrow attachment of the mesocolon.
2. Long pelvic mesocolon.
3. Overloaded colon – there by providing the torting force to the limbs of the bowel. Hence, the dietary and bowel habits of the person play a major role in its causation. So also, older age and improper bowel action as is seen in Neuro Psychiatric disorders are associated with an increased

frequency of occurrence of this condition.

4. Adhesions which act as a organic axis around which the volvulus takes place.

CLINCAL DIAGNOSIS:

Diagnosis of this condition is quite easy. The triad of abdominal plain, distension and constipation are the predominant signs and symptoms of sigmoid volvulus. The duration of symptoms will be characteristically short (Bolt 1956). The finding of gross abdominal distension in patients whose general state remains good should alert the clinician to the possibility of sigmoid vovulus. Its characteristic presentation in the old male as an acute large bowel obstruction with

1. Distended flanks
2. Sometimes visible large bowel loops
3. Empty and ballooned rectum on per rectal examination.
4. The characteristic 'Frimann-dahl' sign on X-Ray

makes the diagnosis unmistakable. However, it is tough to distinguish viable sigmoid colon, clinically, from one which has already gone in for gangrene. Understanding this is important because one of the methods of management of this condition is a conservative non-operative approach and obviously, this cannot be undertaken if gangrene has already set in.

Clinical features that suggest the presence of gangrene include severe pain,

deterioration in the general condition of the patient with tachycardia and hypotension and marked abdominal tenderness with absent intestinal sounds.

Urinary bladder has to be catheterized and Ryle's tube has to be introduced. Most of the cases were operated under spinal anaesthesia and the rest under general aneastheisa.

DIAGNOSIS:

A plain film of abdomen in erect posture is the most useful aid in establishing diagnosis (Frimann 1974, Agrez 1981). The characteristic and significant radiological features include:

1. Inverted U Sign': Inverted U shaped loop massively distended and devoid of haustra.

2. Liver overlap': Haustral margin overlapping the lower border of the liver shadow.

3. 'Left flank overlap sign': Haustral margin overlaps the dilated descending colon.

4. 'Frimann-Dahl' sign:- The two limbs of the loop converge interiorly giving rise to three white lines, representing the outer walls and the two adjacent

inner wall of volvulus. It is usually on the left side of the pelvis.

5. Usually a huge amount of air accumulates in the loop giving an air fluid ratio greater than 2:1

Bursel and Baker conducted a study and concluded that the signs which were most significant and sensitive are:

1. Apex of the loop under left Hemidiaphragm
2. Inferior convergence on left.
3. Left flank overlap sign

The least specific signs are:-

1. Distended sigmoid loop.
2. air fluid ratio greater than 2:1

This is because a similar picture is seen

1. With a distended but non-twisted sigmoid colon.
2. Pseudo-volvulus: distended transverse colon looping down.

TREATMENT:-

Controversies exist regarding the line of management of sigmoid volvulus of both non-gangrenous and gangrenous bowel. At laparotomy, if bowel is non-gangrenous, whether to merely derotate and decompress or to add to this procedure various methods of fixing the loop to prevent recurrence or to primarily resect and ananstomose with or without a proximal diverting colostomy, or to

exteriorize the sigmoid loop with delayed resection and anastomosis has been the surgeons dilemma and a matter of personal preference. If gangrene can be excluded, most surgeons favour non operative methods of

reduction and follow it with an elective resection and anastomosis (Wupper et al 1966, Botsford et al 1967, Hines et al 1967).

The non-operative initial reduction of Sigmoid Volvulus is only a temporary procedure as it is often followed by recurrence in the majority of cases. The incidence of recurrence varies from 33-100% (Botsford et al 1967). Hence, an elective resection and anastomosis of the redundant sigmoid loop should be done (Hinshaw and carter 1957). It is advised that an elective resection and anastomosis of sigmoid loop be carried out during the same admission, because following discharge the patients do not turn up for elective procedure (Ahsan 1961).

It is claimed that primary resection and anastomosis during emergency conditions is generally associated with a high incidence of anastomotic leak with its attended mortality and morbidity. However various authors such as Dean and Nurry (1952), Friedlander (1962) and Tambaku (1970) recommended a primary resection and anastomosis even cases with non gangrenous bowel.

When the bowel is NOT VIABLE, the choice lies between primary resection and anastomosis –with/without proximal colostomy, a Paul – Mikulicz exteriorization and Hartmann's procedure. The majority of surgeons favour of the

latter two procedures to a primary resection and anastomosis (Griffin et al 1945, Gatling et al 1948, Essenson et al 1949, Carden 1966, Hughes 1969, Greenlee 1974).

In the Hartmann's procedure, the second stage procedure of colostomy closure may present serious problems due to dense adhesions between the loops of bowel and the rectal stump. Only if there is extensive gangrene where the distal stump cannot be brought out for exteriorization, the Hartmann's procedure is advisable. In the presence of gangrene, most surgeons favour the Mikulicz exteriorization (Essenson –Ginburg 1949, String 1971, McDonald 1975) provided the distal segment of the sigmoid colon can be brought out with ease. The second stage elective procedure does not carry the problems associated with the Hartmann's procedure. However, sometimes, the traction on the rectum may be followed by thrombosis of the Superior Rectal Vessels and it may undergo necrosis (Carden 1966, GAMA 1976). In these cases and when the gangrene is extensive and involves even the distal segment of the colon, the Hartmann's procedure is the only choice.

MALIGNANT OBSTRUCTION:-

In the west up to 90% of patients suffer obstruction secondary to carcinoma. But the converse is untrue. Only 15% of large bowel malignancies present with obstruction (Phillips et al 1985, Kyllonen 1987). The risk of obstruction by a

colorectal malignancy varies with the site of malignancy.

In decreasing order of risk:-

1. Splenic flexure – upto one half go in for obstruction (Phillip et al 1985, Waldron & Doniovan 1986, Kyloonen 1987).
2. The rest of the colon except the Rectum-around one fifth risk.
3. Rectal carcinoma –one tenth the risk.

However, because of the unequal percentage distribution of malignancy in the different parts, distal colonic malignancy being most common, in clinical practice, approximately three-quarters of all malignant large bowel obstruction cases are situated in the LEFT COLON, i.e., at or distal to the splenic flexure (Serpell et al 1989, Sjodahl et al 1992).

DIAGNOSIS IS BASED ON

1. Clinical features :- classically abdominal pain, distension, absolute constipation and vomiting. Abdominal pain is seen in 90% of cases (Umpelby and Williamson 1984, Serpell et al 1988).
2. Plain abdominal radiograph: Gaseous dilatation of the large bowel proximal to the site of obstruction and a distal cut-off.
3. Thin contrast enema:- The routine use of contrast enema study in the assessment of patients with clinical large bowel obstruction reduces the rate of unnecessary operations and confirms the diagnosis. An additional benefit

is demonstrating the site of obstruction which allows planning of the operative strategy (Koruth et al 1985 a).

4. Per-op findings:- The proximal large bowel is dilated and oedematous.

Management:-

The aim in the management of patient with malignant obstruction, is to relieve the obstruction with low mortality and morbidity, to ensure adequate clearance where possible to ensure long-term survival, but also to provide good palliation in the remainder. It is now generally accepted that for obstruction proximal to the splenic flexure, resection and primary anstomosis is optimal therapy. (Phillips et al 1985). An internal bypass will be justified in patients with an irresectable tumour and in high risk patients with extensive distant spread of disease.

The controversy arrives in the more common, more distal lesions. Most surgeons have been reluctant to ignore the traditional wisdom that it is unwise to anastomose dilated, edematous, unprepared bowel and so therapy has been to initially decompress the bowel (pain and Cahill 1991). At a second operation the obstruction is resected with anastomosis and then the colostomy closed. Presently, it is considered staged tumour resection may result in a worsening of long term prognosis has led on to increased performance of primary tumour resection.

1. DECOMPRESSION AND DELAYED RESECTION:-

Decompression can be achieved by

a) ‘blow-hole’ ostomy or
b) A full fledged laparotomy and ostomy construction.

A ‘blow-hole’ ostomy where only a small incision is made, just sufficient to create a decompression. It is contraindicated in patients for whom an associated perforation may be present (Clerk et al 1975).

Disadvantages:-

1. The procedure by itself is followed by a mortality risk of around 16% partly because only high-risk patients are choosen for this procedure. Mortality is secondary to cardiovascular complications.
2. Once created, the decompression may not be adequate in 5% hence, a future specific procedure may still carry a high mortality (Hoffmann & Jenson, 1984).
3. The stoma itself may suffer problems or retraction, prolapse, necrosis etc (Clerk et al 1975, Waldron and Donovan 1986, Runkel et al 1991).
4. More than half the no.of patients initially intended for a future corrective procedure, never make it-either due to poor general condition (or) disease progression.
5. The overall hospital stay (40-60) days is economically draining.

Other methods of decompression:-

1.Laser Luminisation:-

Laser can be used to relieve the intraluminal obstruction, help in bowel preparation for future elective surgery or might be palliation enough for highly advanced malignancy. Any level of obstruction can be dealt with this way.

2. Trans-tumoral stents:

Lesion in the rectum or sigmoid can be stented as a decompression procedure (Keen and Orsay 1992, Tejero et al 1995).

3. Percutaneous decompression using supra-public catheters through which the bowel can be washed before elective surgery (Salim 1991).

II. RESECTION AND DELAYED ANASTOMOSIS:-

The tumour is resected and the proximal bowel is brought to the surface as end colostomy, while the distal stump is closed intra abdominally (Hartmann's procedure).

Disadvantages:-

In contrast to the deaths following initial decompression, mortality here is secondary to intra abdominal sepsis (Waldron and Donovan 1986).

The stoma is a potential source of complication – necrosis and retraction occurs in upto 20% of patients (Stephen et al 1990, Allen Mersh 1993).

Reversal of the procedure is a major task with a higher morbidity and mortality (Mosdell and Doberneck 1991).

The same problems of disease progression and decreased long term

prognosis exist.

III) RESECTION AND IMMEDIATE ANASTOMOSIS:-

Conceptually, the ideal management of malignant obstructive pathology would be to remove the tumour and restore bowel continuity in one sitting. However, segmental resection of left sided lesions involves anastomosis, in unprepared, dilated and edematous bowel which would give a mortality rate of upto 50% from anastomotic leakage (Irvin and Greaney 1977, Irvin and Goligher 1973).

To minimize these risks, Pre-op bowel preparation is employed:-

1. **On table lavage:-**

A large Foley catheter is introduced into the caecum either through an appendix stump or through the terminal ileum across the ileo-Caecal value. Another scavenger tube is fixed proximal obstruction, but distal to the site of anastomosis intended. Warm saline is run in an antegrade fashion and faeces removed distally. This method is useful if faecal load is viscous fluid.

2. **Simple decompression** of flatus and extrusion of solid faeces is better than lavage, if load is solid as the lavage would make the faeces fluid and difficult to manage. (Amsterdam & Krispin 1985, White & Macfie 1985, Mealy et al 1988, Dorudi et al 1990).

Using the above procedures, resection and immediate anastomosis is found

to have morbidity and mortality rates atleast equal to that of other procedures.

Advantage:-

1. Stoma and its associated problems avoided.
2. Decreased hospital stay.

Added proximal decompression:-

Proximal decompression is not known to decrease the incidence of dehiscence (Irvin and Goligher 1973, Fielding et al 1971, Mealy et al 1988).

SUB TOTAL COLECTOMY:

Advantage:-

1. The entire unprepared proximal bowel is removed.
2. Ileo-colic anastomosis (10% Vs 18% -Phillips et al 1985).
3. Obstructing carcinoma has increased risk of synchronous malignancy in proximal bowel.

Disadvantage:-

1. Diarrhea is more common.
2. Major procedure
3. Colonic nutritional function is lost

Indication:

1. <50 years of age
2. Positive Family History

3. Obstructing Carcinoma

4. Caecal perforation due to back-pressure.

PATIENTS AND METHODS

The study was conducted at Government Rajaji Hospital during the period of 2006-2008. The study included 100 patients. The cases included those patients who were diagnosed pre-operatively as Acute Intestinal Obstruction by clinical, biochemical and radiological parameters. The details of patient included their name, age, sex, IP.No per.op diagnosis, operative operative procedure and any complication.

On admission the patient diagnosed as Acute Intestinal Obstruction were resuscitated, bowel decompressed with Ryles tube and pre op, per.op and post.op. antibiotic given. Those patients with post op infection appropriate antibiotics changed after pus culture and sensitivity test.

OBSERVATION

Total number of patients admitted in Acute Intestinal Obstruction- 100 cases

Large intestine – 16 cases

Small intestine – 84 cases

Etiology

Obstructed/ Strangulated inguinal hernia	40
Adhesive Intestine Obstruction	18
Ileocaecal tuberculosis	7
Femoral hernia	1
Incisional Hernia	1
Para umbilical hernia	1
Ileal Volvulus	1
Foreign body obstruction	1
Ileo colic-instussusception	1
Ca caecum & ascending colon	1
Ca descending colon, splenic flexure	2
Ca sigmoid colon	2
Ca rectum &Anal canal	4
Sigmoid Volvulus	7
Ileoileal knotting	1`
Stricture ileum	2
Meckels diverticulitis	1
Internal Hernia	1
Gangrene –ileum	4
Miscellaneous (Adynamic ileum)	4

SEX INCIDENCE:

Males – 84 cases

Females – 16 cases

AGE INCIDENCE:

	21-30	31-40	41-50	51-60	>60	Total
Ing.Hernia	6	15	7	7	5	40
Adhesion	8	4	3	1	2	18
Ileocaecal TB	1	2	2	1	1	7
Femoral Hernia	0	1	0	0	0	1
Stricture	0	0	1	1	0	2
Intussusception	0	1	0	0	0	1
Sigmoid volvulus	0	2	3	2	0	7
Ca large intestine	1	1	1	5	1	9
Others	2	4	4	4	1	15
Total	18	30	21	21	10	100

INCIDENCE OF STRANGULATION:

Inguinal hernia	3
Adhesive Intestinal obstruction	1
Ileocolic intussusception	1
Sigmoid volvulus	2
Idiopathic	2
No.of cases	9

Mortality:-

Total no.of cases - 5

Morbidity:-

Total no.of.cases - 7

Radiological diagnosis:-

Total no.of.cases - 28

DISCUSSION

In the study conducted there were 100 patients studied as acute intestinal obstruction with involvement of small intestine in 84 cases, large intestine 16 cases.

Inguinal hernia was the most common cause of intestinal obstruction which was 40% of cases.

Adhesive intestinal obstruction was the second most common cause which was 18% of cases.

Males are affected more commonly than females ratio of 4:1

Obstruction/strangulation in an inguinal hernia occurred more commonly after the 3rd decade.

Adhesive intestinal obstruction most commonly occurred during the 3rd decade.

Incidence of ileocecal tuberculosis was distributed evenly through all age groups.

Intussusception - presented in late 40s.

Sigmoid vovulus was common after 3rd decade.

Carcinoma of large intestine affected more commonly after the 3rd decade with increasing incidence.

Mortality was 5% and was associated more commonly in cases which

presented with gangrene bowel. As age increases mortality increased with age.

MORTALITY			
No.	Age	Diagnosis	Reason
1.	75	Ileoileal Knotting	Peritonitis
2.	66	Patchy gangrene ileum	Septic shock
3.	60	Sigmoid volvulus	Anastomotic leak & Septic shock
4.	50	Ca rectum	Secondaries
5.	24	Ileocolic intussusception	Anastomotic leak

MORBIDITY:

Anastomotic leak was the main cause of morbidity and was associated with patients presenting with peritoneal soiling and with old age and strangulation.

MORBIDITY		
No.	Age	Diagnosis
1.	60	Adh.Int.obst.
2.	60	Ileal perforation
3.	60	Patchy gangrene bowl
4.	42	Intussusception
5.	51	Ca sigmoid colon
6.	50	Sigmoid volvulus
7.	50	Strangulated Ing.hernia

Radiological diagnosis were possible only in 28%of cases. Clinical features were more reliable in diagnosis of gangrene bowel.

SUMMARY AND CONCLUSION

- Incidence of involvement of small intestine in intestinal obstruction is 84% and large intestine 16%.
- Most common cause of small intestinal involvement in Intestinal obstruction is inguinal hernia followed by adhesive obstruction.
- Most common cause of large intestinal involvement in Intestinal obstruction is sigmoid volvulus followed by Ca.rectum.
- Males are affected more commonly than females.
- As age increases risk of strangulation increases.
- Sigmoid volvulus was common after 3rd decade.
- Strangulation was associated with increased mortality and morbidity.
- Radiological diagnosis were made in 28% of cases.
- Gangrene bowel diagnosed by clinical features.

BIBLIOGRAPHY

1. Operative surgery Robs Smith's -5th edition.
2. Hamilton Bailey's emergency surgery – 13th edition.
3. Inderbir Singh – "Rotation of Gut" – Human Embrology. 7th edition.
4. Lee Mc Gregor's Synopsis of Surgical Anatomy 13th edition 1986- KM Varghese Company.
5. R.J.Last – Anatomy –Regional and Applied, 11th edition.
6. Chaurasia BD- Human Anatomy – 4rd edition Vol.2,3rd edition 1995.
7. Bailey and Love – Short practice of Surgery 25rd edition
8. Maingot's Abdominal operations, 11th edition
9. Essential surgical practice –SA Cuschieri 4th edition
10. Surgery of the colon & rectum – R.John Nicholls.
11. Moynihan B- Abdominal operation Vol.1 -1 Wb Sanders.

PROFORMA

Name : Age : Sex :

IP No. :

Address :

D.O.A : D.O.D :

Clinical features :

Radiological features :

Pre op. Diagnosis :

Per op. Findings :

Surgery :

Post op. Period :

Follow up Analysis :